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# FOREST DISEASE CONDITIONS

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## IN THE NORTHERN REGION

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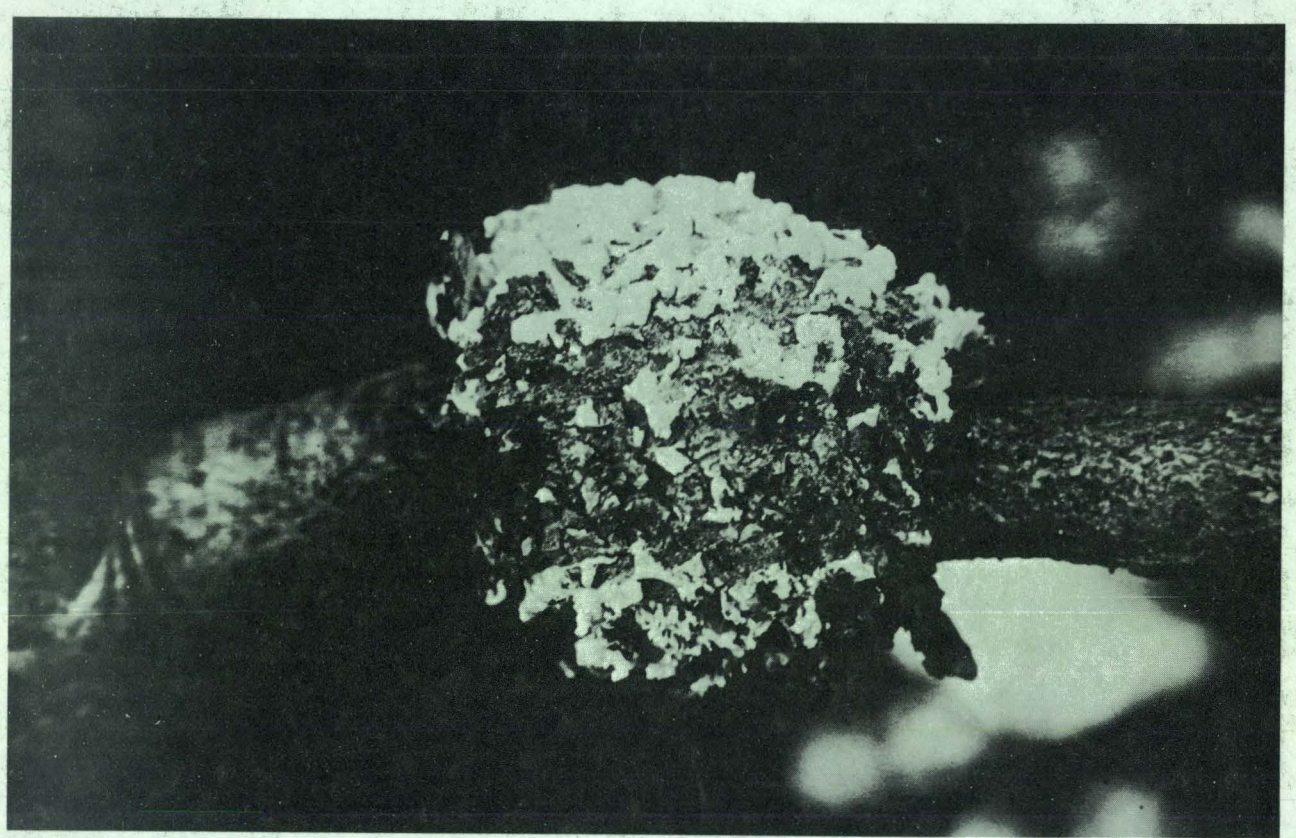

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U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE
DIVISION OF STATE AND PRIVATE FORESTRY
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# FOREST DISEASE CONDITIONS IN THE NORTHERN REGION

1963

By
Harvey V. Toko, Pathologist
Division of State and Private Forestry

COVER PHOTO: Western gall rust on lodgepole pine caused by Peridermium harknessii Moore. at time of aeciospore production.

U.S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
Division of State and Private Forestry
Region 1
Missoula, Montana

# FOREST DISEASE CONDITIONS
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Division of State and Private Forestry

## SUMMARY OF CONDITIONS

Dwarfmistletoes are the number one forest disease pests of the Region. They are generally found throughout all the National Forests with the most common forms infecting lodgepole pine, Douglas-fir, and western larch. Comandra blister rust infections of lodgepole pine in the National Forests east of the Continental Divide were, in general, found to have occurred about 15 or more years ago. However, a low percentage of infection was found on seedlings where infection had occurred within the past 5 years. Needle cast diseases were widespread with Hypodermella concolor on lodgepole pine reaching epidemic proportions in the Blackfoot, Gallatin, and Flint Creek Valleys. Meria laricis, a needle disease of larch was more prevalent than in 1962. Rhabdocline needle cast of Douglas-fir was of relatively minor importance. Several unknown diseases were found, with the most serious of these a dieback of larch in the Flathead and Kootenai National Forests. The symptoms of this disease closely resemble a shoot blight reported to be causing severe damage to larch in Japan.

## DWARFMISTLETOE

Dwarfmistletoes, Arceuthobium spp.

The dwarfmistletoes probably cause the greatest volume loss of any other forest pest in Region 1. As indicated in recent surveys conducted by the Intermountain Forest and Range Experiment Station, they are found on all 16 National Forests.

The dwarfmistletoes present in the Region are Arceuthobium americanum, A. douglasii and various host forms of A. campylopodum found on larch, spruce, ponderosa pine and the five-needled pines. The most prevalent species are A. americanum on lodgepole pine, A. douglasii on Douglas-fir, and A. campylopodum f. laricis on larch. The mistletoe of ponderosa pine is not known to occur in western Montana.

Spread of this parasite is continuing at a slow rate. Silvicultural control practices by clear cutting and timber stand improvement were applied to about 15,000 acres in 1963. At the present time, chemical controls are unknown.

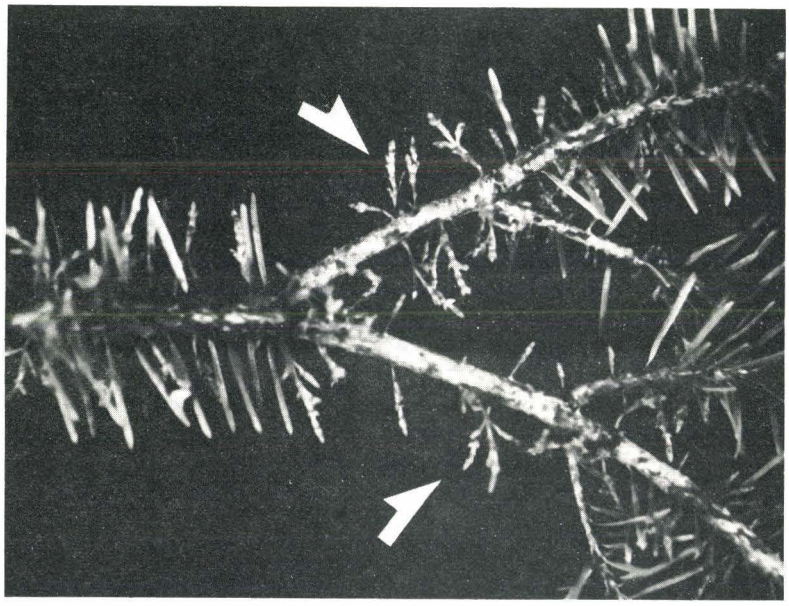

Figure 1.--Dwarfmistletoe of Douglas-fir (Arceuthobium douglasii Engelm.) The plants are small, seldom becoming more than 1½ inches high.

Figure 2.--Spiketops in lodgepole pine stand with high incidence of dwarfmistletoe infection.

## ROOT ROTS

Root Rots, Fomes annosus (Fr.) Cook and Armillaria mellea Vahl ex Fr.

Both Fomes and Armillaria root rot have been reported from scattered locations throughout the Region. However, surveys have not been made to determine the frequency of occurrence or loss in timber caused by these organisms. It is anticipated that as management practices become intensive, the problems caused by root rots will increase.

Figure 3.--Mycelial fan of Armillaria root rot on Douglas-fir. Diameter of stem approximately 3 inches. The white, veined, fan-shaped mycelial mats usually occur between the bark and the wood at the root collar (arrow).

## POLE BLIGHT

Pole blight of western white pine has greatly subsided during the past 10 years. However, some moderately active pole blight centers still persist. Some tree mortality is still occurring within most of the old centers, but no new centers have been detected. Pole blight caused very heavy tree mortality in western white pine pole stands throughout the St. Joe, Coeur d'Alene, Kaniksu, and Kootenai National Forests from about 1940 to 1953. There is no conclusive proof that this disordered condition is the result of a tree disease.

## RUSTS

Comandra Blister Rust, Cronartium comandrae, Pk.

An extensive survey of lodgepole pine stands showing symptoms typical of comandra blister rust was made in 1963. In the areas examined, with one exception, the rust infections were found to occur in trees that were about 40 years old or older. Most of the rust infections had occurred about 15 years or more ago. An area with relatively recent infections was found near Elkhorn Hot Springs in the Beaverhead National Forest. In this lodgepole pine stand infection had occurred within a period of 2 to 5 years. About 1 percent of 600 10- to 20-year-old seedlings examined had aecia producing cankers mainly on the lower branches. In the trees that were 60 + years in this stand, about 25 to 30 percent of the lodgepole pine is infected.

Considerable variations in the percentage of comandra blister rust infected trees were found throughout the Region. The heaviest infections were found in the Beaverhead, Gallatin, and portions of the Custer National Forests with the average infection about 15 to 20 percent of the total trees. Fewer comandra cankers were found in the areas examined in the northern part of the Region than in the southern portion. In the area south of Glacier National Park and in the vicinity of Kings Hill on the Lewis and Clark National Forest only about 3 to 5 percent of the total trees were infected. However, variations in the percentage of infection occurred within adjacent drainages.

Several other disease complexes tend to confuse the symptom picture of comandra blister rust. Among these are dwarfmistletoe, Atropellis canker, porcupine or rodent damage, and to a lesser extent, western gall rust and stalactiforme rust. Spike tops and/or dead laterals were found to be associated with damage caused by all of these complexes. Since combinations of these diseases can occur in the same stand, close examination of the canker is a necessary criteria to any survey for comandra blister rust.

White Pine Blister Rust, Cronartium ribicola A. Fisch.

White pine blister rust has become established throughout the five-needle pine stand of this Region. The whitebark and limber pine stands have never been protected from the rust in Region 1 except in National Parks. By the year 2000, white pine blister rust will have destroyed most all unprotected limber and whitebark pine stands. These species have little commercial value, but by occupying an ecological niche unsuited to any other tree species, they have a significant affect on watershed and esthetic values.

Western Gall Rust, Peridermium harknessii Moore.

Scattered infection centers of western gall rust were noted through most of the lodgepole pine stands in the Region. However, most areas show only a relatively low incidence of infection. The heaviest infection noted was in the vicinity of Rogers Pass, Helena National Forest, where about 80 percent of the young seedlings had at least one, and sometimes two or more galls on each stem or lateral. Indications are that severe losses in reproduction will occur in this area.

A heavy infection site of western gall rust in ponderosa pine was reported from the Tarkio Flat area in the Lolo National Forest.

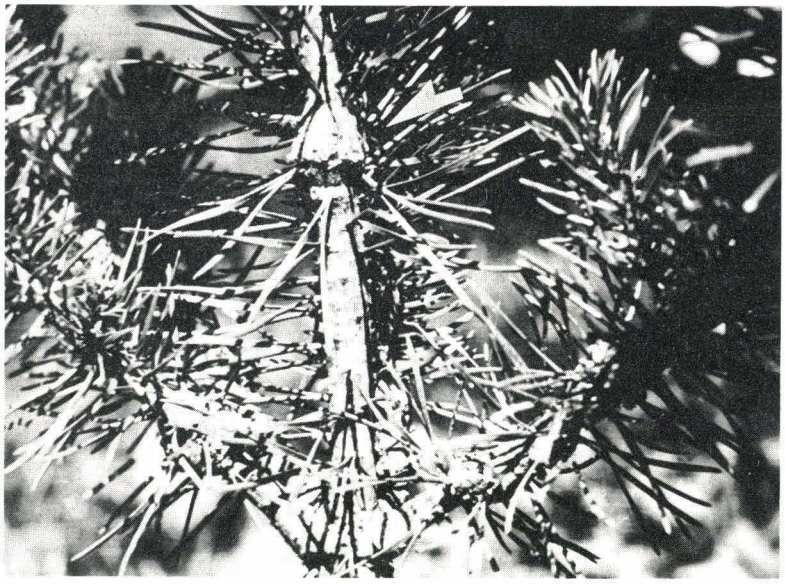

Figure 4.--Western gall rust cankers caused by the fungus Peridermium harknessii Moore. on young lodgepole pine seedling. Arrow points to one gall; two others are also present.

## NURSERY DISEASES

Summer Mortality (Root rot), Cylindrocladium scoparium Morgan.

A sudden dieback in seedbeds occurred at the Coeur d'Alene Forest Nursery during the latter part of June and early July. Approximately 50 percent of the total ponderosa pine seedlings were dead or dying, with somewhat lower mortality occurring in larch and spruce seedbeds. Laboratory isolations failed to sporulate but the formation of microsclerotia and other cultural characteristics fit the general description of C. scoparium. Additional cultural identification and infection studies will have to be completed before definite proof of pathogenicity can be established.

Douglas-fir Dieback, Fusarium spp.

Douglas-fir seedlings at the Savenac Forest Tree Nursery showed evidence of mortality during the late summer. About 20 percent of the seedlings in some seedbeds turned brown and died. Species of Fusarium were the most commonly encountered organisms in isolations made from the roots. Reinfection of seedlings was not attempted and, since Fusarium are omnipresent, definite proof of the cause of the disease was not established.

## NEEDLE DISEASES

Lodgepole Needle Cast, Hypodermella concolor (Dearn.) Darker.

An epidemic outbreak of a needle cast disease occurred in seedling and sapling lodgepole pine stands in widely separated areas of Montana in 1963. The most severe browning and subsequent heavy defoliation occurred in the Gallatin River Valley; the Blackfoot River Valley, especially in the vicinity of Lincoln; and in the Flint Creek drainage near Philipsburg. However, the fungus could be found in most lodgepole pine stands examined.

This disease under epidemic conditions causes spectacular symptoms through June and early July. Although some loss of increment probably occurs, the sporadic nature of its attacks tends to minimize damage.

Elytroderma Needle Cast, Elytroderma deformans (Weir) Darker.

Damage to ponderosa pine by Elytroderma needle cast is continuing. The heaviest infection centers were noted in the Bitterroot Valley, especially in the Bass Creek, Lick Creek, East Fork Bitterroot, Mud Creek and Blue Joint drainages. Scattered moderate to heavy infection centers were also noted in the vicinity of Flathead Lake. Several other small, scattered areas of ponderosa pine stands show varying degrees of infection and subsequent defoliation and browning. Some mortality in young natural reproduction has occurred, especially in the lower Bass Creek drainage in the Bitterroot National Forest.

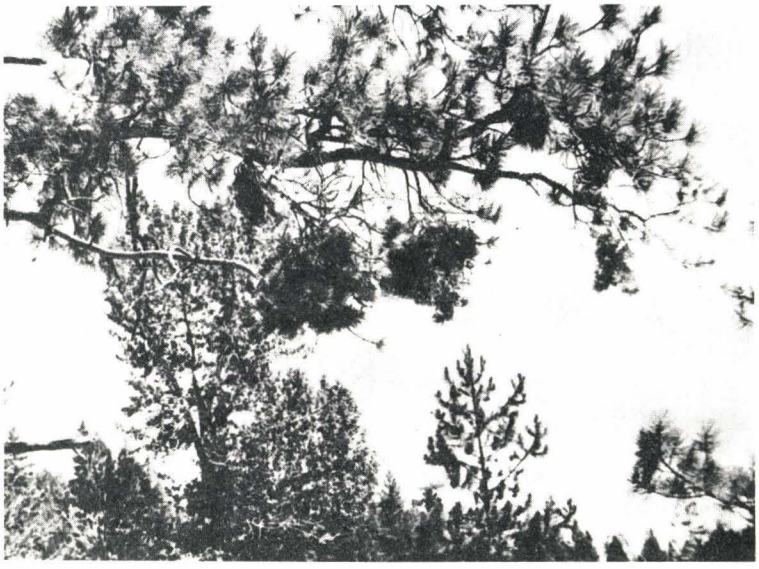

Figure 5.--Witches brooms produced on ponderosa pine as a result of the systemic infection of the buds by the needle cast fungus Elytroderma deformans (Weir) Darker.

Rhabdocline Needle Cast, Rhabdocline pseudotsugae Syd.

Only widely scattered infection sites of Rhabdocline needle cast were found throughout the Region in 1963. Relatively little damage was detected on the foliage of young Douglas-fir from either 1961 or 1962 infection. Some light infection centers were found in the Rexford area of the Kootenai National Forest, in the vicinity of Flathead Lake near Big Arm, and in the Hebgen Lake area of the Gallatin National Forest.

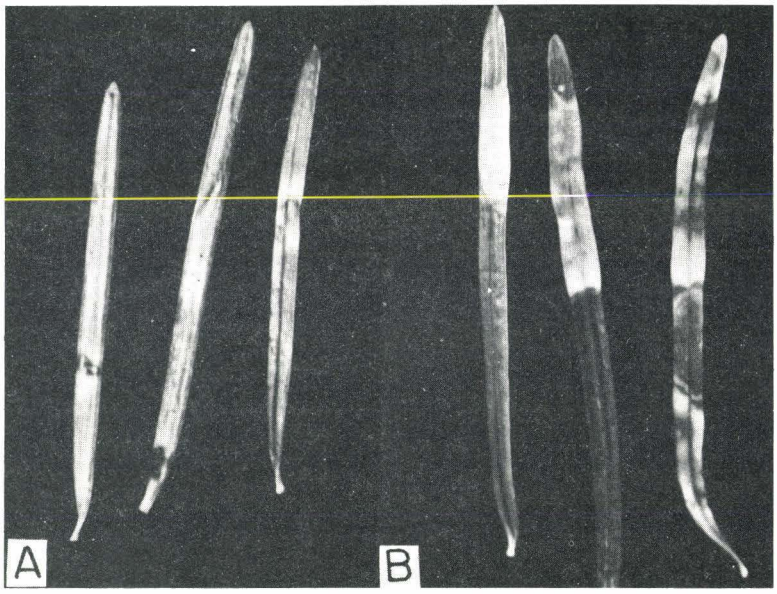


Figure 6.--A comparison of Rhabdocline needle cast and Contarinia needle midge on Douglas-fir needles. The midge produces a large swollen, discolored reddish-purple area on the needle (B). Infections by Rhabdocline (A) are more localized. The swollen area usually is on the lower surface of the needle and confined to the erupted area of the epidermis where the fructification of the needle cast is found.

Larch Needle Cast, Hypodermella laricis Tub.

This disease continues to be endemic throughout most of the larch stands in the Region. No evidence of tree mortality that can be directly associated with this needle cast has been noted. However, individual branches show some mortality where heavy repeated infections have occurred.

Red Band Needle Disease, Dothistroma pini Hulbary var linearis Thyr[1/]

Heavy infection by this fungus was found in a young plantation of ponderosa pine in the Pete King drainage on the Clearwater National Forest. It has been considered an important pathogen throughout north-central Idaho in ponderosa and lodgepole pine stands.

Meria Needle Disease, Meria laricis Vuill.

A high percentage of needle discoloration in western larch throughout western Montana and Idaho was found to be caused by Meria needle disease. Little evidence of any resultant damage other than early needle drop was noted. However, this disease occurred on larch needles simultaneously with Hypodermella laricis in many instances and subsequently differentiation as to cause of damage would be difficult if not impossible to determine.

## DISEASES OF UNKNOWN CAUSES

Larch Dieback[2/] - A dieback or blight of the leader and lateral terminals on 10- to 20-year-old larch was reported in the Elbow Lake area west of Kalispell in the summer of 1962. Subsequent reports and ground checks indicated this same condition present on the Glacier View District of the Flathead National Forest, and to a lesser degree on some areas of the Kootenai National Forest. No evidence of pathogenic fungi could be found on samples submitted by the Forests or in field examinations. A check of the area in 1963 indicated the condition was still present but to a lesser degree. Some evidence of tree mortality was found in the Elbow Lake area. Studies will be continued to determine the cause of this dieback.

Douglas-fir Droop[3/] - In the Rexford area of the Kootenai National Forest, a flaccid condition of terminals and lateral tips of Douglas-fir was found in a Christmas tree sale area. The limb tips and terminal shoot drops, needles become brown and defoliation of the shoot tip occurs. Some mortality of leaders was apparently caused by this disease. No evidence of insect or pathogenic conditions could be found.

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1/ Previously identified as Actinothyrium marginatum.

2/ The symptoms of this disease resemble the symptoms of a shoot blight (Physalospora laricina) which is causing serious damage in Japan.

3/ This was recently reported to be virus caused. See Montana State College Plant Pathology Newsletter, Dec. 5, 1963, Vol. 1, No. 1, p. 4.

Douglas-fir Dwarf Needle - Widespread areas of pole-sized Douglas-fir on the St. Joe and Clearwater National Forests were found to have discolored and shortened (about one-half normal size) needles. The bleached-brown needles are first visible in the upper crown, then the symptoms appear to progress toward the lower crown. No evidence of root rot or other pathogenic organisms could be found.

Douglas-fir Limber Leader - In the Powderhouse area of the Clearwater National Forest, a flaccid condition was found primarily in the terminal leaders of Douglas-fir. In addition to this flaccid condition almost complete loss of needles occurred on the terminal. Some affected trees showed evidence of Armillaria root rot but this finding was not consistent and, therefore, was not considered to be the cause of the disease. The symptoms of this disease differ considerably from those in the Rexford area of the Kootenai National Forest.